



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------|------------------|
| 10/530,507 | 04/06/2005 | Pasi Tikka | 14219-080US1 P2002,0843 U | 5763 |
| 26161 | 7590 | 03/04/2009 | EXAMINER | |
| FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022 | | | SUMMONS, BARBARA | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2817 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 03/04/2009 | ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/530,507 | Applicant(s) TIKKA ET AL. | |
| | Examiner BARBARA SUMMONS | Art Unit 2817 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-10, 12, 15 and 17-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-10, 17-22 and 26 is/are allowed.
- 6) ☒ Claim(s) 12, 15, 23 and 24 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Withdrawn Allowable Subject Matter

1. The indicated allowability of claims 12, 15, 23 and 24 is withdrawn in view of the amendment received 11/14/08, which removed a claimed feature from independent claim 15 (see the last two lines thereof). The new rejection(s) below is (are) therefore, necessitated by Applicants' amendment.

Drawings

2. The drawings including a new sheet with new figures 10c and 10d were received on 11/14/08. These drawings have been Approved by the Examiner. However, it should be noted that the sheet was inaccurately labeled "Replacement Sheet" and should have been labeled "New Sheet" pursuant to 37 CFR 1.121(d). Therefore, in order to avoid any possible confusion and be sure that the correct figures all print in any future issued patent, the Examiner suggests that Applicants provide a full set of replacement drawings (since there are now 6 sheets instead of 5), also including the informal changes made by the original preliminary amendment that removed the German language from Figs. 2-4, at their earliest convenience.

Specification

3. Receipt of the substitute specification filed 11/14/08 is acknowledged, and it has been Approved and entered.

Withdrawn Claim Rejections - 35 USC §§ 112 and 103

4. Applicants' amendment received 11/14/08 has overcome all of the prior section 112 rejections, and they are therefore withdrawn. Applicants' certified translation of the

Art Unit: 2817

foreign priority document has also removed Metzger et al. as applicable prior art, as well as Nishimura WO 02/093763 (of record) which also showed a capacitor connected to bulk acoustic wave resonators and formed within the layers of a multilayered substrate.

New Grounds of Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 12, 15 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. JP 2002-217676 (of record) in view of Ylilammi U.S. 6,515,558.

Regarding claims 15 and 23, Fig. 2 of Shibata et al. discloses an electrical circuit 10 comprising: a substrate 30; a stack of resonators on the left side in Fig. 2, the stack of resonators having two first resonators 12 and 14 (see Fig. 1) that operate with bulk

Art Unit: 2817

acoustic waves, the first resonators comprising an upper resonator 14 having upper and lower electrodes 56 and 52, respectively, with a piezoelectric layer 54 therebetween, and a lower resonator 12 having upper and lower electrodes 46 and 40, respectively, with a piezoelectric layer 44 therebetween, and a coupling layer 48 between the upper electrode 46 of the lower resonator 12 and the lower electrode 52 of the upper resonator 14; and a second resonator 16 on the right side in Fig. 2, comprising upper and lower electrodes 46 and 42, respectively, with piezoelectric layer 44 therebetween; and wherein the upper electrode 46 of the lower first resonator 12 and the lower electrode 52 of the upper first resonator 14 are electrically connected to the upper electrode 46 of the second resonator 16 in the center of Fig. 2 and as shown by the center node in Fig. 1. Regarding claim 12, electrode 42 of the second resonator 16 is connected to ground. That is, Fig. 2 of Shibata et al. is substantially the same as Applicants' Fig. 11.

However, regarding claim 15, Shibata shows a via hole 34 for isolating the substrate 30 from the stack of resonators rather than an acoustic mirror disposed between the substrate 30 and the stack of resonators.

Ylilammi discloses that it would have been well known to use an acoustic mirror between bulk acoustic wave (BAW) resonators and a substrate as an art recognized alternative means of acoustically isolating the resonators from the substrate (see col. 4, lines 17-20), and wherein the acoustic mirror provides benefits over the cavity being good heat conduction between the resonators and the substrate and a solidly mounted resonator having solid contact with the substrate being less subject to breakage than a

Art Unit: 2817

membrane over a cavity resonator, as suggested by Ylilammi (see col. 4, lines 20-26) and as would have been known by one of ordinary skill in the BAW resonator art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the electrical circuit with bulk acoustic wave resonators of Shibata et al. (Fig. 2) by having replaced the cavity 34 under the resonator stack with an acoustic mirror between the substrate 30 and the resonator stack, because such an obvious modification would have been the mere substitution of art recognized alternative structures for providing the required acoustic isolation between the resonators and the substrate as suggested by Ylilammi (col. 4, lines 17-20) that would have provided the advantageous benefits and known desirable results in the art of proper cooling of the resonators by good heat conduction from the resonators to the substrate and resonators less prone to breakage than membrane over cavity resonators due to the solid contact formed by solidly mounting the resonators via the acoustic mirror to the substrate as also suggested by Ylilammi (col. 4, lines 20-26).

7. Claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. JP 2002-217676 (of record) in view of Ylilammi U.S. 6,515,558 as applied to claim 15 above, and further in view of Ruby et al. U.S. 6,472,954 (of record).

The Shibata/Ylilammi combination discloses the invention as discussed above, except for a capacitor in parallel with or in series with at least one of the resonators.

Ruby discloses that it would have been known by those of ordinary skill in the BAW resonator filter art to provide capacitors (see e.g. 132 in Fig. 8 vs. Fig. 7 which is

Art Unit: 2817

just the BAW resonator) in parallel with BAW resonators in BAW ladder filters such as Shibata's in order to provide resonators with tailored effective coupling coefficients (see e.g. col. 9, lines 29-33) and therefore tailored frequency responses such as steeper roll-off at pass band edges (see e.g. col. 7, lines 26-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the electrical circuit with BAW resonators of the Shibata(Fig. 2)/Ylilammi combination by having provided a capacitor in parallel with at least one of the resonators, as suggested by the exemplary teaching thereof by Ruby (Fig. 8), because such an obvious modification would have provided the advantageous benefits of tailored effective coupling coefficients of the resonators of the ladder filter and hence tailored frequency responses such as steeper roll-off at the edges of the pass band as explicitly suggested by Ruby (col. 7, lines 26-31 and col. 9, lines 29-33), which would have been merely determined by the individual filter frequency characteristic requirements of each respective individual intended use of the BAW resonator filter circuit.

Allowable Subject Matter

8. Claims 3-10, 17-22 and 26 are allowable over the prior art of record.
9. Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments with respect to the claims and the prior rejections, now withdrawn, have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA SUMMONS whose telephone number is (571)272-1771. The examiner can normally be reached on M-Thu, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs
February 26, 2009

/Barbara Summons/
Primary Examiner, Art Unit 2817